

PATENT

INSTITUT FRANÇAIS DU PETROLE

**METHOD FOR RAPID FORMATION OF A STOCHASTIC MODEL
REPRESENTATIVE OF A HETEROGENEOUS UNDERGROUND
RESERVOIR, CONSTRAINED BY DYNAMIC DATA**

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ABSTRACT

- Method for rapidly forming a stochastic model of Gaussian or related type, representative of a porous heterogeneous medium such as an underground reservoir, constrained by data characteristic of the displacement of fluids.
- It comprises construction of a chain of realizations representative of a stochastic model (Y) by gradually combining an initial realization of (Y) and one or more other realization(s) of (Y) referred to as composite, and minimizing an objective function (J) measuring the difference between a set of non-linear data deduced from said combination by means of a simulator simulating the flow in the medium and said data measured in the medium, by adjustment of the coefficients of the combination. The composite realization results from the projection of the direction of descent of the objective function, calculated by the flow simulator for the initial realization, in the vector subspace generated by P realizations of (Y), randomly drawn and independent of one another, and of the initial realization. During the optimization stage, the chain thus obtained is explored so as to identify a realization that allows to minimize the objective function (J). In order to sufficiently reduce this objective function, chains constructed one after the other are explored by taking as the initial realization the optimum realization determined for the previous chain.
- Applications : notably development of oil reservoirs for example.